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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/285,986	04/05/99	CHEU	TSMC98-403

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MMC1/1013

EXAMINER  
BEREZNY, N

ART UNIT 2813	PAPER NUMBER
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DATE MAILED: 10/13/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

<b>Office Action Summary</b>	Application No. 09/285,986	Applicant(s) CHEU ET AL.	
	Examiner Nema O Berezny	Art Unit 2813	

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 August 2000.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 and 27-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 and 27-30 is/are rejected.
- 7) ☒ Claim(s) 15 and 16 is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some \* c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☐ received.
2. ☐ received in Application No. (Series Code / Serial Number) \_\_\_\_\_.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

**Attachment(s)**

- |   |  |
|---|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 20) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Drawings***

1. The objection to the drawings in prior Office Action, mailed 4-14-00 is hereby withdrawn, subsequent to corrections by Applicant in Amendment A, filed 8-17-00.

### ***Specification***

2. The objection to the specification in prior Office Action, mailed 4-14-00 is hereby withdrawn, subsequent to corrections by Applicant in Amendment A, filed 8-17-00.

### **Claim Objections**

3. The objection to claims 1, 8, and 20 in prior Office Action, mailed 4-14-00 is hereby withdrawn, subsequent to corrections by Applicant in Amendment A, filed 8-17-00.
4. Amended claims 15 and 16 are objected to. Said claims should be numbered as claims 17 and 18, respectively. Correction is required. For examination purposes, claims 15 and 16 were examined as the claims were originally filed; claims 17 and 18 were examined as amended claims 15 and 16, respectively.

**Claim Rejections - 35 USC § 112**

5. The rejection of claims 13, 17, 18, 19, 20, and 30 under 35 USC 112, second paragraph in prior Office Action, mailed 4-14-00 is hereby withdrawn, subsequent to corrections by Applicant in Amendment A, filed 8-17-00.

***Double Patenting***

6. The rejection of claims 1-4, 8-11, 13, 16-23, 25-26, and 28-30 under 35 USC 101, double patenting in prior Office Action, mailed 4-14-00 is hereby withdrawn, subsequent to corrections by Applicant in Amendment A, filed 8-17-00.

**Claim Rejections - 35 USC § 103**

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-25, and 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fu (5,807,787) in view of Yamamoto (5,013,689), and further in view of Lukanc (6,066,557). Fu discloses providing interconnecting lines and bond pads of aluminum or aluminum/copper alloy at a thickness of 4000 to 8000 Angstrom on a silicon dioxide insulating film overlying a semiconductor substrate in which circuit elements are formed, being separated by an insulating layer; depositing a first and

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second passivation layer, comprising plasma enhanced oxide of about 2000 Angstrom and a plasma enhanced silicon nitride of about 7000 Angstrom, respectively; depositing a layer of photosensitive polyimide at a thickness of 5.0 to 9.5 micron over said passivation layers; patterning and etching said polyimide over said bond pads; patterning and etching said passivation layers to expose said bond pads; and curing and cross-linking said polyimide layer in a nitrogen gas ambient between 300 and 400 degrees C for 1.5 to 2.5 hours, and UV exposing portions of said polyimide through a mask while protecting portions overlying said bond pads, then dissolving said unexposed polyimide portions (claims 1-9, col.5 lines 14-24). However, Fu does not disclose leaving in place the remaining portions of polyimide after said patterning and etching said polyimide step. Yamamoto discloses forming bonding pad windows through a polyimide layer, and leaving the remaining polyimide in place upon the substrate (claims 1, 4). Therefore, it would have been obvious to a person skilled in the art at the time of the invention to use the remaining polyimide of Yamamoto with the method of forming passivation layers of Fu. The polyimide layer of Yamamoto has the dual purpose of forming a mask for the bond pads, and functioning as a passivation layer to increase productivity, reliability, and yields (col.2 lines 52-59).

Fu does not disclose specific operating parameters of PECVD of the first and second passivation layers at a temperature of 350 to 450 degrees C with 2.0 to 2.8 Torr pressure and 8 to 12 seconds, or etching parameters for the first passivation layer of Ar/CF<sub>4</sub> etchant, 120 to 160 degrees C, a pressure of 0.30 to 0.40 Torr and a time of 33 to 39 seconds, and etching parameters for the second passivation layer of He/NF<sub>3</sub>

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etchant, a temperature of 80 to 100 degrees C, a pressure of 1.20 to 1.30 Torr, and a time of 20 to 30 seconds. The specification contains no disclosure of either the critical nature of the claimed operating parameters or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Fu and Yamamoto do not disclose applying said polyimide layer prior to patterning and etching said passivation layers. Lukanc discloses applying a passivation layer (Fig.1B el.21) onto a copper metallization structure (el.31, 32B), forming a patterned insulation layer, then depositing a barrier layer (el.35) over the patterned insulation layer (el.23) and the exposed passivation layer. The barrier layer is then etched away from the interconnect structure, then the passivation layer is etched away to expose the interconnect structure (col.4 line 67 – col.5 line 8; col.5 lines 17-37). Therefore, it would have been obvious to a person skilled in the art at the time of the invention to use the application of a passivation layer and a barrier layer prior to patterning and etching either layer of Lukanc, with the method of forming bonding pads of Fu and Yamamoto, in order to protect the underlying layer(s) from the detrimental effects of the etching process (col.5 lines 37-40). Even though Lukanc uses a metal barrier layer rather than a polyimide layer, the barrier layer's purpose is the same as the polyimide layer of Applicant, which is to "provide protection to the interconnect lines after which a bonding pad is created" (Amendment A p.14 lines 11-12).

***Response to Arguments***

9. Applicant's arguments with respect to claims 1-25 and 27-30 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nema O Berezny whose telephone number is (703) 305-3445. The examiner can normally be reached on M-F 8:30-5:00.

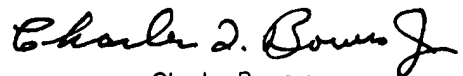
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Bowers, Jr. can be reached on (703) 308-2417. The fax phone

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numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

NB  
October 10, 2000



Charles Bowers  
Supervisory Patent Examiner  
Technology Center 2800